ASSALAM O ALAIKUM

All Dear fellows

ALL IN ONE MTH301 Calculus II

Midterm solved papers

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BSCS 4th semester

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Remember me in your prayers

MIDTERM EXAMINATION

Spring 2010

MTH301- Calculus II (Session - 3)

1. Every real number corresponds to____________on the co-ordinate line.

- **Infinite number of points**
- Two points (one positive and one negative)
- A unique point
- None of these

2. There is one-to-one correspondence between the set of points on co-ordinate line and __________.

- Set of real numbers
- Set of integers
- **Set of natural numbers**
- Set of rational numbers

3. Which of the following is associated to each point of three dimensional space?

- A real number
- An ordered pair
- An ordered triple
- **A natural Number**

4. All axes are positive in ___________octant.

- **First**
- Second
- Fourth
- Eighth

5. The spherical co-ordinates of a point are $\left(\sqrt{3}, \frac{\pi}{3}, \frac{\pi}{2}\right)$.What are its cylindrical co-ordinates?

- $\left(\frac{\sqrt{3}}{2}, \frac{3}{2}, 0\right)$
- $\left(\sqrt{3}\cos\frac{\pi}{3}, \sqrt{3}\sin\frac{\pi}{3}, 0\right)$
- $\left(\sqrt{3}\sin\frac{\pi}{3}, \frac{\pi}{2}, \sqrt{3}\cos\frac{\pi}{3}\right)$
- $\left(\sqrt{3}, \frac{\pi}{3}, 0\right)$

6. Suppose $f(x,y) = xy - 2y^2$ *where* $x = t3 + 1$ *and* $y = t$. Which one of the following is true?

- $\frac{df}{dt} = -4t + 2$
- $\frac{df}{dt} = -16t - t$
- $\frac{df}{dt} = 18t + 2$
- $\frac{df}{dt} = -10t^2 + 8t + 1$

7. Let $w = f(x,y,z)$ *and* $x = g(r, s)$, $y = h(r, s)$, $z = t(r, s)$ then by chain rule $\frac{\partial w}{\partial r} =$

- $\frac{\partial w}{\partial x}\frac{\partial x}{\partial r} + \frac{\partial w}{\partial y}\frac{\partial y}{\partial r} + \frac{\partial w}{\partial z}\frac{\partial z}{\partial r}$

- $\frac{\partial w}{\partial r}\frac{\partial x}{\partial r}+\frac{\partial w}{\partial r}\frac{\partial y}{\partial r}+\frac{\partial w}{\partial r}\frac{\partial z}{\partial r}$
- $\frac{\partial w}{\partial x}\frac{\partial x}{\partial r}\frac{\partial x}{\partial s}+\frac{\partial w}{\partial y}\frac{\partial y}{\partial r}\frac{\partial y}{\partial s}+\frac{\partial w}{\partial z}\frac{\partial z}{\partial r}\frac{\partial z}{\partial s}$
- $\frac{\partial w}{\partial r}\frac{\partial r}{\partial x}+\frac{\partial w}{\partial r}\frac{\partial r}{\partial y}+\frac{\partial w}{\partial r}\frac{\partial r}{\partial z}$

8. Magnitude of vector $\vec{a}$ is 2, magnitude of vector $\vec{b}$ is 3and angle between them when placed tail to tail is 45 degrees. What is$\vec{a}.\vec{b}$?

- 4.5
- **6.2**
- 5.1
- 4.2

9. Is the function $f(x,y)$ continuous at origin? If not, why?$f(x,y)=\begin{cases}0 & if\ \ x\geq 0\ and\ y\geq 0\\ 1 & otherwise\end{cases}$

- $f(x,y)$ is continuous at origin
- $f(0,0)$ is not defined
- $f(0,0)$ is defined but $\lim_{(x,y)\to(0,0)} f(x,y)$ does not exist
- $f(0,0)$ is defined and $\lim_{(x,y)\to(0,0)} f(x,y)$ exist but these two numbers are not equal.

10. Is the function $f(x,y)$ continuous at origin? If not, Why?$f(x,y)=\begin{cases}\frac{3x^2y}{x^2+y^2} & if(x,y)\neq 0\\ 0 & if\ (x,y)=0\end{cases}$

- $f(x,y)$ is continuous at origin
- $f(0,0)$ is not defined
- $f(0,0)$ is defined but $\lim_{(x,y)\to(0,0)} f(x,y)$ does not exist
- $f(0,0)$ is defined and $\lim_{(x,y)\to(0,0)} f(x,y)$ exist but these two numbers are not equal.

11. Let R be a closed region in two dimensional space. What does the double integral over R calculates?

- Area of R
- Radius of inscribed circle in R.
- Distance between two endpoints of R.
- None of these

12. Which of the following formula can be used to find the volume of a parallelepiped with adjacent edges formed by the vectors $\vec{a}$, $\vec{b}$ and $\vec{c}$?

- $|\vec{a} \times (\vec{b} \times \vec{c})|$
- $|\vec{a} . (\vec{b} . \vec{c})|$
- $|\vec{a} . (\vec{b} \times \vec{c})|$
- $|\vec{a} \times (\vec{b} . \vec{c})|$

13. Two surfaces are said to be orthogonal at appoint of their intersection if their normals at that point are__________.

- Parallel
- Perpendicular
- In opposite direction
- Same direction

14. By Extreme Value Theorem, if a function $f(x,y)$ is continuous on a closed and bounded set R, then $f(x,y)$ has both __________ on R.

- Absolute maximum and absolute minimum value
- Relative maximum and relative minimum value
- Absolute maximum and relative minimum value
- Relative maximum and absolute minimum value

15. Let the function $f(x,y)$ has continuous second-order partial derivatives $(f_{xx} \; , \; f_{yy} \; and \; f_{xy})$ in some circle centered at a critical point (x_0, y_0) and let $D = f_{xx}(x_0, y_0) \; f_{yy}(x_0, y_0) - f_{xy}^2(x_0, y_0)$ if

$D > 0 \; and \; f_{xx}(x_0, y_0) < 0 \; then \; f \; has$ _________ .

- Relative maximum at (x_0, y_0)
- Relative minimum at (x_0, y_0)
- Saddle point at (x_0, y_0)
- No conclusion can be drawn.

16. Let the function $f(x,y)$ has continuous second-order partial derivatives $(f_{xx} \; , \; f_{yy} \; and \; f_{xy})$ in some circle centered at a critical point (x_0, y_0) and let $D = f_{xx}(x_0, y_0) \; f_{yy}(x_0, y_0) - f_{xy}^2(x_0, y_0)$ if

if $D = 0$ then _________.

- f has relative maximum at (x_0, y_0)
- f has relative minimum at (x_0, y_0)
- f has saddle point at (x_0, y_0)
- No conclusion can be drawn.

17. $If\ \ R = R_1 \cup R_2\ \ where\ R_1\ and\ R_2$ are no over lapping regions then

$$\iint_{R_1} f(x,y)dA + \iint_{R_2} f(x,y)dA =$$

- $\iint_{R} f(x,y)dA$
- $\iint_{R_1} f(x,y)dA \cup \iint_{R_2} f(x,y)dA$
- $\iint_{R} f(x,y)dV$
- $\iint_{R} f(x,y)dV \cap \iint_{R_2} f(x,y)dA$

18. $If\ \ R = \{(x,y)\ / 0 \le x \le 2 and\ 1 \le y \le 4\}\ then \iint_R (6x^2 + 4xy^3)dA =$

- $\int_1^4 \int_0^2 (6x^2 + 4xy^3)\, dydx$
- $\int_0^2 \int_1^4 (6x^2 + 4xy^3)\, dydx$
- $\int_1^4 \int_0^2 (6x^2 + 4xy^3)\, dydx$
- $\int_2^4 \int_0^1 (6x^2 + 4xy^3)\, dydx$

19. $If\ \ R = \{(x,y)\ / 2 \le x \le 4 and\ 0 \le y \le 1\}\ then\ \iint_R (4xe^{2y})dA =$

- $\int_0^1 \int_2^4 (4xe^{2y})\, dydx$

- $\int_0^1\int_2^4 \left(4xe^{2y}\right) dxdy$
- $\int_1^4\int_0^2 \left(4xe^{2y}\right) dxdy$
- $\int_1^4\int_0^2 \left(4xe^{2y}\right) dydx$

20. $If \quad R=\left\{(x\ \ y,) \ \ / \ 0 \le x\le \ \ 4 and \quad 0 \le y \le 9 \ \right\} \ then \ \iint_R \left(3x-4x\sqrt{xy}\right)dA=$

- $\int_0^9\int_0^4 \left(3x-4x\sqrt{xy}\right)dydx$
- $\int_0^9\int_0^4 \left(3x-4x\sqrt{xy}\right)dxdy$
- $\int_4^9\int_0^0 \left(3x-4x\sqrt{xy}\right)dxdy$
- $\int_0^4\int_0^9 \left(3x-4x\sqrt{xy}\right)dydx$

21. Suppose that the surface $f\left(x,y,z\right)$ has continuous partial derivatives at the point $\left(a,b,c\right)$ Write down the equation of tangent plane at this point.

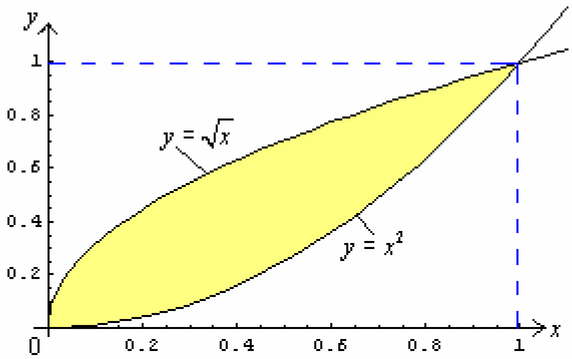
22. Evaluate the following double integral $\int\int\left(12xy^2-8x^3\right)dydx$.

23. Evaluate the following double integral $\int\int\left(3+2x-3y^2\right)dxdy$

24. Let $f\left(x,y,z\right)=xy^2e^z$ Find the gradient of f .

25. Find, Equation of Tangent plane to the surface $f\left(x,y,z\right)=x^2+y^2+z-9$ at the point $\left(1,2,4\right)$.

26. Use the double integral in rectangular co-ordinates to compute area of the region bounded by the curves $y=x^2$ and $y=\sqrt{x}$.



MIDTERM EXAMINATION

Fall 2009

MTH301- Calculus II

Question No: 1 (Marks: 1) - Please choose one

i. Let x be any point on co-ordinate line. What does the inequality -3 < x < 1 means?

a. ► The set of all integers between -3 and 1

b. ► The set of all natural numbers between -3 and 1.

c. ► The set of all rational numbers between -3 and 1

d. ► The set of all real numbers between -3 and 1

Question No: 2 (Marks: 1) - Please choose one

Which of the following number is associated to each point on a co-ordinate line?

► An integer

► A real number

► A rational number

► A natural number

Question No: 3 (Marks: 1) - Please choose one

Which of the following set is the union of set of all rational and irrational numbers?

► Set of rational numbers

► Set of integers

► **Set of real numbers**

► Empty set.

Question No: 4 (Marks: 1) - Please choose one

π is an example of -----------

► **Irrational numbers**

► Rational numbers

► Integers

► Natural numbers

Question No: 5 (Marks: 1) - Please choose one

Which of the following is associated to each point on a plane?

► A real number

► A natural number

▶ An ordered pair

▶ An ordered triple

Question No: 6 (Marks: 1) - Please choose one

-------------------- planes intersect at right angle to form three dimensional space.

▶ **Three**

▶ Four

▶ Eight

▶ Twelve

Question No: 7 (Marks: 1) - Please choose one

At each point of domain, the function ----------------

▶ **Is defined**

▶ Is continuous

▶ Is infinite

▶ Has a limit

Question No: 8 (Marks: 1) - Please choose one

What is the general equation of parabola whose axis of symmetry is parallel to y-axis?

▶ $y = ax^2 + b \quad (a \neq 0)$

► $x = ay^2 + b \qquad (a \neq 0)$

► $y = ax^2 + bx + c \qquad (a \neq 0)$

► $x = ay^2 + by + c \qquad (a \neq 0)$

Question No: 9 (Marks: 1) - Please choose one

The spherical co-ordinates (ρ, θ, ϕ), of a point are $\left(2, \frac{\pi}{4}, 0\right)$. What are the rectangular co-ordinates of this point?

► $(0, 0, \sqrt{2})$

► $(2, 0, 0)$

► $(0, 0, 2)$

► $(\sqrt{2}, 0, \sqrt{2})$

Question No: 10 (Marks: 1) - Please choose one

Let $f(x, y) = y^2 x^4 e^x + 2$.

Which method is best suited for evaluation of $\frac{\partial^5 f}{\partial y^3 \partial x^2}$?

► Normal method of finding the higher order mixed partial derivatives

► Chain Rule

► Laplacian Method

► **Euler's method for mixed partial derivative**

Question No: 11 (Marks: 1) - Please choose one

Suppose $f(x, y) = x^3 e^{xy}$. Which one of the following is correct?

► $\frac{\partial f}{\partial x} = 3x^2 e^{xy} + x^3 y e^{xy}$

► $\frac{\partial f}{\partial x} = 3x^2 e^{xy} + x^4 e^{xy}$

► $\frac{\partial f}{\partial x} = 3x^2 e^{xy}$

► $\frac{\partial f}{\partial x} = 3x^2 y e^{xy}$

Question No: 12 (Marks: 1) - Please choose one

Suppose $f(x, y) = x^3 e^{xy}$. Which one of the statements is correct?

► $\frac{\partial f}{\partial y} = 3x^3 e^{xy}$

► $\frac{\partial f}{\partial y} = x^3 e^{xy}$

► $\frac{\partial f}{\partial y} = x^4 e^{xy}$

▶ $\frac{\partial f}{\partial y} = x^3 y e^{xy}$

Question No: 13 (Marks: 1) - Please choose one

Suppose $f(x, y) = 2xy \ where \ x = t^2 + 1 \ and \ y = 3 - t$. Which one of the following is true?

▶ $\frac{df}{dt} = 6t - 4t^2 - 2$

▶ $\frac{df}{dt} = 6t - 2$

▶ $\frac{df}{dt} = 4t^3 + 6t - 6$

▶ $\frac{df}{dt} = -6t^2 + 12t - 2$

Question No: 14 (Marks: 1) - Please choose one

Let i, j and k be unit vectors in the direction of x-axis, y-axis and z-axis respectively. Suppose that $\vec{a} = 2i + 5j - k$. What is the magnitude of vector $\vec{a}$?http://vustudents.ning.com

▶ 6

▶ 30

► $\sqrt{30}$

► $\sqrt{28}$

Question No: 15 (Marks: 1) - Please choose one

Is the function $f(x, y)$ continuous at origin? If not, why?

$$f(x, y) = \frac{xy}{x^2 + y^2}$$

► $f(x, y)$ is continuous at origin

► $\lim_{(x,y)\to(0,0)} f(x, y)$ **does not exist**

► $f(0, 0)$ is defined and $\lim_{(x,y)\to(0,0)} f(x, y)$ exists but these two numbers are not equal.

Question No: 16 (Marks: 1) - Please choose one

Let R be a closed region in two dimensional space. What does the double integral over R calculates?

► Area of R.

► Radius of inscribed circle in R.

► Distance between two endpoints of R.

► None of these

Question No: 17 (Marks: 1) - Please choose one

What is the relation between the direction of gradient at any point on the surface to the tangent plane at that point ?

► parallel

► perpendicular

► opposite direction

► No relation between them.

Question No: 18 (Marks: 1) - Please choose one

Two surfaces are said to intersect orthogonally if their normals at every point common to them are ----------

► perpendicular

► parallel

► in opposite direction

Question No: 19 (Marks: 1) - Please choose one

Let the function $f(x, y)$ has continuous second-order partial derivatives $\left(f_{xx}\ ,\ \ f_{yy}\ and\ \ f_{xy} \right)$ in some circle centered at a critical point (x_0, y_0) and let $D = f_{xx}(x_0, y_0)\ f_{yy}(x_0, y_0) - f_{xy}{}^2(x_0, y_0)$

If $D > 0$ and $f_{xx}(x_0, y_0) < 0$ then f has ---------------

► **Relative maximum at (x_0, y_0)**

► Relative minimum at (x_0, y_0)

► Saddle point at (x_0, y_0)

► No conclusion can be drawn.

Question No: 20 (Marks: 1) - Please choose one

Which of the following are direction ratios for the line joining the points $(1, 3, 5)$ and $(2, -1, 4)$?

► 3, 2 and 9

► **1, -4 and -1**

► 2, -3 and 20

► 0.5, -3 and 5/4

Question No: 21 (Marks: 1) - Please choose one

If $R = R_1 \cup R_2$, where R_1 and R_2 are no overlapping regions then

$$\iint_{R_1} f(x,y)dA + \iint_{R_2} f(x,y)dA =$$

► $\iint_{R} f(x,y)dA$

► $\iint_{R_1} f(x,y)dA \cup \iint_{R_2} f(x,y)dA$

► $\iint_{R} f(x,y)dV$

►

$$\iint_{R_1} f(x,y)dA \cap \iint_{R_2} f(x,y)dA$$

►

Question No: 22 (Marks: 1) - Please choose one

$If\ R=\{(x,y)/2\le x\le 4\,and\,0\le y\le 1\},then$

$\iint_R (4xe^{2y})dA=$

$$\int_0^1\int_2^4 (4xe^{2y})dydx$$

►

$$\int_0^1\int_2^4 (4xe^{2y})dxdy$$

►

$$\int_1^4\int_0^2 (4xe^{2y})dxdy$$

►

$$\int_1^4\int_0^2 (4xe^{2y})dydx$$

►

Question No: 23 (Marks: 1) - Please choose one http://vustudents.ning.com

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$If\ R=\{(x,y)/0\le x\le 2\, and\, 0\le y\le 3\}, then$

$$\iint_R (1-ye^{xy})dA=$$

► $\int_0^2 \int_0^3 (1-ye^{xy})dydx$

► $\int_0^2 \int_0^3 (1-ye^{xy})dxdy$

► $\int_2^3 \int_0^0 (1-ye^{xy})dxdy$

► $\int_0^2 \int_2^3 (4xe^{2y})dydx$

Question No: 24 (Marks: 1) - Please choose one

Which of the following is geometrical representation of the equation $y = x^2$, in three dimensional space?

► **Parabola**

► Straight line

► Half cylinder

► Cone

Question No: 25 (Marks: 3)

Consider the point $\left(\sqrt{3}, \frac{\pi}{3}, \frac{\pi}{2}\right)$ in spherical coordinate system. Find the rectangular coordinatesof this point.

Question No: 26 (Marks: 5)

Consider a function $f(x, y) = 4xy - x^4 - y^4$ .One of its critical point is $(1, 1)$. Find whether $(1, 1)$ is relative maxima, relative minima or saddle point of $f(x, y)$.

Question No: 27 (Marks: 10)

Find Directional derivative of the function, $f(x, y) = x^2 y - 4y^3$, at the point $(2, 1)$ in the direction of vector, $\vec{u} = \frac{\sqrt{3}}{2} i + \frac{1}{2} j$

MIDTERM EXAMINATION

Spring 2010

MTH301- Calculus II

Question No: 1 (Marks: 1) - Please choose one

Which of the following is the interval notation of real line?

► **$(-\infty, +\infty)$**

► $(-\infty, 0)$

► $(0, +\infty)$

Question No: 2 (Marks: 1) - Please choose one

What is the general equation of parabola whose axis of symmetry is parallel to y-axis?

► $y = ax^2 + b \quad (a \neq 0)$

► $x = ay^2 + b \quad (a \neq 0)$

► $y = ax^2 + bx + c \quad (a \neq 0)$

► $x = ay^2 + by + c \quad (a \neq 0)$

Question No: 3 (Marks: 1) - Please choose one

Which of the following is geometrical representation of the equation $y = 4$, in three dimensional space?

► **A point on y-axis**

► Plane parallel to xy-plane

► Plane parallel to yz-axis

► Plane parallel to xz-plane

Question No: 4 (Marks: 1) - Please choose one

Suppose $f(x,\ y) = x^3 e^{xy}$. Which one of the statements is correct?

- ▶ $\frac{\partial f}{\partial y} = 3x^3 e^{xy}$
- ▶ $\frac{\partial f}{\partial y} = x^3 e^{xy}$
- ▶ $\frac{\partial f}{\partial y} = x^4 e^{xy}$
- ▶ $\frac{\partial f}{\partial y} = x^3 y e^{xy}$

Question No: 5 (Marks: 1) - Please choose one

--- If

$f(x,\ y) = x^2 y - y^3 + \ln x$

then $\frac{\partial^2 f}{\partial x^2}$ =

- ▶ $2xy + \frac{1}{x^2}$
- ▶ $2y + \frac{1}{x^2}$
- ▶ $2xy - \frac{1}{x^2}$

▶ $2y - \frac{1}{x^2}$

Question No: 6 (Marks: 1) - Please choose one

Let $w = f(x, y, z)$ and $x = g(r, s)$, $y = h(r, s)$, $z = t(r, s)$ then by chain rule

$\frac{\partial w}{\partial r} =$

▶ $\frac{\partial w}{\partial x}\frac{\partial x}{\partial r} + \frac{\partial w}{\partial y}\frac{\partial y}{\partial r} + \frac{\partial w}{\partial z}\frac{\partial z}{\partial r}$

▶ $\frac{\partial w}{\partial r}\frac{\partial x}{\partial r} + \frac{\partial w}{\partial r}\frac{\partial y}{\partial r} + \frac{\partial w}{\partial r}\frac{\partial z}{\partial r}$

▶ $\frac{\partial w}{\partial x}\frac{\partial x}{\partial r}\frac{\partial x}{\partial s} + \frac{\partial w}{\partial y}\frac{\partial y}{\partial r}\frac{\partial y}{\partial s} + \frac{\partial w}{\partial z}\frac{\partial z}{\partial r}\frac{\partial z}{\partial s}$

▶ $\frac{\partial w}{\partial r}\frac{\partial r}{\partial x} + \frac{\partial w}{\partial r}\frac{\partial r}{\partial y} + \frac{\partial w}{\partial r}\frac{\partial r}{\partial z}$

Question No: 7 (Marks: 1) - Please choose one

Is the function $f(x, y)$ continuous at origin? If not, why?

$$f(x, y) = \begin{cases} \frac{3x^2 y}{x^2 + y^2} & if \ (x, y) \neq 0 \\ 0 & if \ (x, y) = 0 \end{cases}$$

► $f(x, y)$ is continuous at origin

► **$f(0, 0)$ is not defined**

► $f(0, 0)$ **is defined but** $\lim_{(x,y)\to(0,0)} f(x, y)$ **does not exist**

► $f(0, 0)$ is defined and $\lim_{(x,y)\to(0,0)} f(x, y)$ exists but these two numbers are not equal.

Question No: 8 (Marks: 1) - Please choose one

Let R be a closed region in two dimensional space. What does the double integral over R calculates?

► Area of R.

► Radius of inscribed circle in R.

► Distance between two endpoints of R.

► **None of these (not sure)**

Question No: 9 (Marks: 1) - Please choose one

Two surfaces are said to be orthogonal at a point of their intersection if their normals at that point are ---------

► Parallel

► **Perpendicular**

► In opposite direction

Question No: 10 (Marks: 1) - Please choose one

Two surfaces are said to intersect orthogonally if their normals at every point common to them are ----------

► perpendicular

► parallel

► in opposite direction

Question No: 11 (Marks: 1) - Please choose one

Let the function $f(x, y)$ has continuous second-order partial derivatives $\left(f_{xx} ,\ f_{yy}\ and\ f_{xy} \right)$ in some circle centered at a critical point (x_0, y_0) and let

$D = f_{xx}(x_0, y_0)\ f_{yy}(x_0, y_0) - f_{xy}{}^2(x_0, y_0)$

If $D > 0$ and $f_{xx}(x_0, y_0) > 0$ then f has ---------------

► Relative maximum at (x_0, y_0)

► Relative minimum at (x_0, y_0)

► Saddle point at (x_0, y_0)

► No conclusion can be drawn. http://vustudents.ning.com

Question No: 12 (Marks: 1) - Please choose one

Let the function $f(x, y)$ has continuous second-order partial derivatives $\left(f_{xx} ,\ f_{yy}\ and\ f_{xy} \right)$ in some circle centered at a critical point (x_0, y_0) and let

$D = f_{xx}(x_0, y_0)\ f_{yy}(x_0, y_0) - f_{xy}{}^2(x_0, y_0)$

If $D > 0$ and $f_{xx}(x_0, y_0) < 0$ then f has ---------------

► **Relative maximum at (x_0, y_0)**

► Relative minimum at (x_0, y_0)

► Saddle point at (x_0, y_0)

► No conclusion can be drawn.

Question No: 13 (Marks: 1) - Please choose one

Let the function $f(x, y)$ has continuous second-order partial derivatives $\left(f_{xx}\ ,\ f_{yy}\ and\ f_{xy}\right)$ in some circle centered at a critical point (x_0, y_0) and let
$D = f_{xx}(x_0, y_0)\ f_{yy}(x_0, y_0) - f_{xy}{}^2(x_0, y_0)$

If $D < 0$ then f has ---------------

► Relative maximum at (x_0, y_0)

► Relative minimum at (x_0, y_0)

► **Saddle point at (x_0, y_0)**

► No conclusion can be drawn

Question No: 14 (Marks: 1) - Please choose one

Let (x_1, y_1, z_1) and (x_2, y_2, z_2) be any two points in three dimensional space. What does the formula $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$ calculates?

▶ **Distance between these two points**

▶ Midpoint of the line joining these two points

▶ Ratio between these two points

Question No: 15 (Marks: 1) - Please choose one

The function $f(x, y) = \sqrt{y - x}$ is continuous in the region --------- and discontinuous elsewhere.

▶ $x \neq y$

▶ $x \leq y$

▶ $x > y$ http://vustudents.ning.com

Question No: 16 (Marks: 1) - Please choose one

Plane is an example of ---------------------

▶ Curve

▶ Surface

▶ Sphere

▶ Cone

Question No: 17 (Marks: 1) - Please choose one

If $R = R_1 \cup R_2$, where R_1 and R_2 are no overlapping regions then

$$\iint_{R_1} f(x,y)dA + \iint_{R_2} f(x,y)dA =$$

► $\iint_R f(x,y)dA$

► $\iint_{R_1} f(x,y)dA \cup \iint_{R_2} f(x,y)dA$

► $\iint_R f(x,y)dV$

► $\iint_{R_1} f(x,y)dA \cap \iint_{R_2} f(x,y)dA$

Question No: 18 (Marks: 1) - Please choose one

$If\ R = \{(x,y)/0 \le x \le 2\ and\ 1 \le y \le 4\}, then$

$$\iint_R (6x^2 + 4xy^3)dA =$$

► $\int_1^4 \int_0^2 (6x^2 + 4xy^3)dydx$

$$\int_0^2 \int_1^4 (6x^2 + 4xy^3)dxdy$$

▶

$$\int_1^4 \int_0^2 (6x^2 + 4xy^3)dxdy$$

▶

$$\int_2^4 \int_0^1 (6x^2 + 4xy^3)dxdy$$

▶

Question No: 19 (Marks: 1) - Please choose one

$If\ R = \{(x,y)/0 \le x \le 2\, and\, 0 \le y \le 3\}, then$

$$\iint_R (1 - ye^{xy})dA =$$

$$\int_0^2 \int_0^3 (1 - ye^{xy})dydx$$

▶

$$\int_0^2 \int_0^3 (1 - ye^{xy})dxdy$$

▶

$$\int_2^3 \int_0^0 (1 - ye^{xy})dxdy$$

▶

$$\int_0^2 \int_2^3 (4xe^{2y})dydx$$

▶

Question No: 20 (Marks: 1) - Please choose one

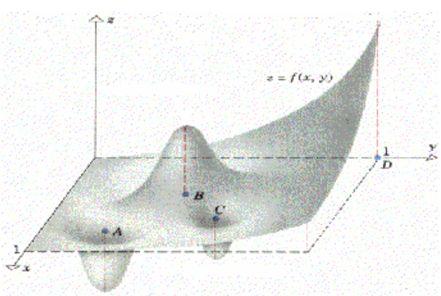
$If\ R = \{(x,y)/0 \le x \le 4 and\ 0 \le y \le 9\}, then$

$\iint_R (3x - 4x\sqrt{xy})dA =$

- ► $\int_0^9 \int_0^4 (3x - 4x\sqrt{xy})dydx$
- ► $\int_0^4 \int_4^9 (3x - 4x\sqrt{xy})dxdy$
- ► $\int_4^9 \int_0^0 (3x - 4x\sqrt{xy})dxdy$
- ► $\int_0^4 \int_0^9 (3x - 4x\sqrt{xy})dydx$

Question No: 21 (Marks: 2)

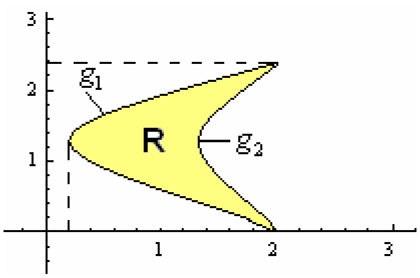
Following is the graph of a function of two variables



In its whole domain, state whether the function has relative maximum value or absolute maximum value at point B. Also, justify your answer

Question No: 22 (Marks: 2)

Let the function $f(x, y)$ is continuous in the region R, where R is bounded by graph of functions g_1 and g_2 (as shown below). http://vustudents.ning.com



In the following equation, replace question mark (?) with the correct value.

$$\iint_R f(x, y)\, dA = \int_?^? \int_?^? f(x, y) \_\_\_\_\_\_?\_\_\_\_\_$$

Question No: 23 (Marks: 3)

Evaluate the following double integral.

$$\iint \left(3+2x-3y^2\right) dx\, dy$$

Question No: 24 (Marks: 3)

Let $f(x, y, z) = yz^3 - 2x^2$

Find the gradient of f.

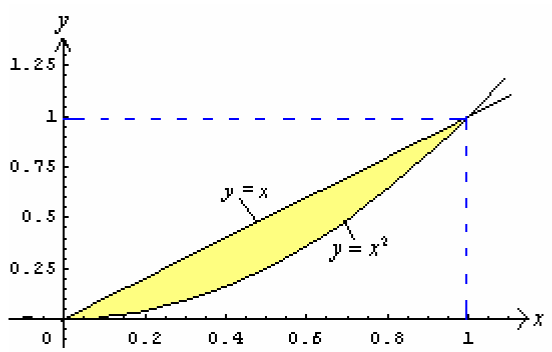
Question No: 25 (Marks: 5)

Find, Equation of Normal line (in parametric form) to the surface

$f(x, y, z) = xy + 2yz - xz^2 + 10$ at the point $(-5, 5, 1)$

Question No: 26 (Marks: 5)

Use double integral in rectangular co-ordinates to compute area of the region bounded by the curves $y = x \text{ and } y = x^2$, in the first quadrant.



MIDTERM EXAMINATION

Spring 2010

MTH301- Calculus II (Session - 3)

Question No: 1 (Marks: 1) - Please choose one

Which of the following number is associated to each point on a co-ordinate line?

► An integer

► A real number

► A rational number

► A natural number

Question No: 2 (Marks: 1) - Please choose one

If $a > 0$, then the parabola $y = ax^2 + bx + c$ opens in which of the following direction?

► Positive x - direction

► Negative x - direction

► Positive y - direction

► Negative y - direction

Question No: 3 (Marks: 1) - Please choose one

Rectangular co-ordinate of a point is $(1, \sqrt{3}, -2)$. What is its spherical co-ordinate?

$\left(2\sqrt{2}, \frac{\pi}{3}, \frac{3\pi}{2}\right)$

►

$$\left(2\sqrt{2}, \frac{\pi}{2}, \frac{3\pi}{4}\right)$$

►

$$\left(2\sqrt{2}, \frac{\pi}{3}, \frac{3\pi}{4}\right)$$

►

$$\left(\sqrt{2}, \frac{\pi}{3}, \frac{3\pi}{4}\right)$$

►

Question No: 4 (Marks: 1) - Please choose one

If a function is not defined at some point, then its limit ----------- exist at that point.

► Always

► Never

► **May**

Question No: 5 (Marks: 1) - Please choose one

Suppose $f(x, y) = x^3 e^{xy}$. Which one of the statements is correct?

► $\frac{\partial f}{\partial y} = 3x^3 e^{xy}$

► $\frac{\partial f}{\partial y} = x^3 e^{xy}$

► $\frac{\partial f}{\partial y} = x^4 e^{xy}$

► $\frac{\partial f}{\partial y} = x^3 y e^{xy}$

Question No: 6 (Marks: 1) - Please choose one

If $f(x, y) = x^2 y - y^3 + \ln x$

then $\frac{\partial^2 f}{\partial x^2}$ =

. ▶. $2xy+\frac{1}{x^2}$

. ▶. $2y+\frac{1}{x^2}$

. ▶. $2xy-\frac{1}{x^2}$

. ▶. $2y-\frac{1}{x^2}$

Question No: 7 (Marks: 1) - Please choose one

Suppose $f(x,\ y)=xy-2y^2\ \ where\ \ x=3t+1\ \ and\ \ y=2t$. Which one of the following is true?

. ▶. $\frac{df}{dt}=-4t+2$

. ▶. $\frac{df}{dt}=-16t-t$

. ▶. $\frac{df}{dt}=18t+2$

. ▶. $\frac{df}{dt}=-10t^2+8t+1$

Question No: 8 (Marks: 1) - Please choose one

Is the function $f(x, y)$ continuous at origin? If not, why?

$$f(x, y) = \begin{cases} 0 & If \;\; x \geq 0 \; and \;\; y \geq 0 \\ 1 & Otherwise \end{cases}$$

► $f(x, y)$ is continuous at origin

► $f(0, 0)$ is not defined

► $f(0, 0)$ is defined but $\lim_{(x,y)\to(0,0)} f(x, y)$ does not exist

► $f(0, 0)$ is defined and $\lim_{(x,y)\to(0,0)} f(x, y)$ exists but these two numbers are not equal.

Question No: 9 (Marks: 1) - Please choose one

What is the relation between the direction of gradient at any point on the surface to the tangent plane at that point ?

► parallel

► **perpendicular**

► opposite direction

► No relation between them.

Question No: 10 (Marks: 1) - Please choose one

Two surfaces are said to intersect orthogonally if their normals at every point common to them are ----------

► perpendicular

► parallel

► **in opposite direction**

Question No: 11 (Marks: 1) - Please choose one

By Extreme Value Theorem, if a function $f(x, y)$ is continuous on a closed and bounded set R, then $f(x, y)$ has both ---------------- on R.

► **Absolute maximum and absolute minimum value**

► Relative maximum and relative minimum value

Question No: 12 (Marks: 1) - Please choose one

Let the function $f(x, y)$ has continuous second-order partial derivatives $\left(f_{xx} \ , \ \ f_{yy} \ and \ \ f_{xy} \right)$ in some circle centered at a critical point (x_0, y_0) and let

$D = f_{xx}(x_0, y_0) \ f_{yy}(x_0, y_0) - f_{xy}{}^2(x_0, y_0)$

If $D > 0$ and $f_{xx}(x_0, y_0) < 0$ then f has ---------------

► **Relative maximum at (x_0, y_0)**

► Relative minimum at (x_0, y_0)

► Saddle point at (x_0, y_0)

► No conclusion can be drawn.

Question No: 13 (Marks: 1) - Please choose one

Let the function $f(x, y)$ has continuous second-order partial derivatives $\left(f_{xx} \ , \ \ f_{yy} \ and \ \ f_{xy} \right)$ in some circle centered at a critical point (x_0, y_0) and let

$D = f_{xx}(x_0, y_0) \ f_{yy}(x_0, y_0) - f_{xy}{}^2(x_0, y_0)$

If $D = 0$ then ---------------

► f has relative maximum at (x_0, y_0)

► f has relative minimum at (x_0, y_0)

► f has saddle point at (x_0, y_0)

► **No conclusion can be drawn.**

Question No: 14 (Marks: 1) - Please choose one

The function $f(x,\ y) = \sqrt{y - x}$ is continuous in the region --------- and discontinuous elsewhere.

► $x \neq y$

► $x \leq y$

► $x > y$

Question No: 15 (Marks: 1) - Please choose one

Plane is an example of ---------------------

► Curve

► **Surface**

► Sphere

► Cone

Question No: 16 (Marks: 1) - Please choose one

If $R = R_1 \cup R_2$, where R_1 and R_2 are no overlapping regions then

$$\iint_{R_1} f(x,y)dA + \iint_{R_2} f(x,y)dA =$$

► $\iint_{R} f(x,y)dA$

► $\iint_{R_1} f(x,y)dA \cup \iint_{R_2} f(x,y)dA$

$$\iint_R f(x,y)dV$$

►

$$\iint_{R_1} f(x,y)dA \cap \iint_{R_2} f(x,y)dA$$

►

Question No: 17 (Marks: 1) - Please choose one

$If\ R = \{(x,y)/0 \le x \le 2\, and\, 1 \le y \le 4\}, then$

$\iint_R (6x^2 + 4xy^3)dA =$

$$\int_1^4 \int_0^2 (6x^2 + 4xy^3)dydx$$

►

$$\int_0^2 \int_1^4 (6x^2 + 4xy^3)dxdy$$

►

$$\int_1^4 \int_0^2 (6x^2 + 4xy^3)dxdy$$

►

$$\int_2^4 \int_0^1 (6x^2 + 4xy^3)dxdy$$

►

Question No: 18 (Marks: 1) - Please choose one

$If\ R = \{(x,y)/0 \le x \le 2\, and\, -1 \le y \le 1\}, then$

$\iint_R (x + 2y^2)dA =$

$$\int_{-1}^{1}\int_{0}^{2}(x+2y^2)dydx$$

▶

$$\int_{0}^{2}\int_{1}^{-1}(x+2y^2)dxdy$$

▶

$$\int_{-1}^{1}\int_{0}^{2}(x+2y^2)dxdy$$

▶

$$\int_{1}^{2}\int_{-1}^{0}(x+2y^2)dxdy$$

▶

Question No: 19 (Marks: 1) - Please choose one

$If\ R=\{(x,y)/0\le x\le 2\,and\,0\le y\le 3\},then$

$$\iint_R (1-ye^{xy})dA=$$

$$\int_{0}^{2}\int_{0}^{3}(1-ye^{xy})dydx$$

▶

$$\int_{0}^{2}\int_{0}^{3}(1-ye^{xy})dxdy$$

▶

$$\int_{2}^{3}\int_{0}^{0}(1-ye^{xy})dxdy$$

▶

$$\int_{0}^{2}\int_{2}^{3}(4xe^{2y})dydx$$

▶

Question No: 20 (Marks: 1) - Please choose one

$If\ R=\{(x,y)/0\le x\le 4 and\ 0\le y\le 9\}, then$

$\iint_R (3x-4x\sqrt{xy})dA=$

- $\int_0^9\int_0^4 (3x-4x\sqrt{xy})dydx$
- $\int_0^4\int_4^9 (3x-4x\sqrt{xy})dxdy$
- $\int_4^9\int_0^0 (3x-4x\sqrt{xy})dxdy$
- $\int_0^4\int_0^9 (3x-4x\sqrt{xy})dydx$

Question No: 21 (Marks: 2)

Evaluate the following double integral.

$\iint\left(2xy+y^3\right)\ dx\ dy$

Question No: 22 (Marks: 2)

$Let\ \ f(x,\ y)=2+x^2+\dfrac{y^2}{4}$

$Find\ the\ gradient\ of\ f$

Question No: 23 (Marks: 3)

Evaluate the following double integral.

$$\iint \left(3+2x-3y^2\right)\, dx\ dy$$

Question No: 24 (Marks: 3)

$Let\ \ f(x,\ y,\ z) = yz^3 - 2x^2$
$Find\ the\ gradient\ of\ f.$

Question No: 25 (Marks: 5)

Find Equation of a Tangent plane to the surface $f(x,\ y,\ z) = x^2 + 3y + z^3 - 9$ at the point $(2,\ -1,\ 2)$

Question No: 26 (Marks: 5)

Evaluate the iterated integral

$$\int_2^4 \int_{\frac{x}{2}}^{\sqrt{x}} (xy)\, dy\, dx$$

MIDTERM EXAMINATION

MTH301

Suppose $f(x, y) = x^3 e^{xy}$. Which one of the following is correct?

$\frac{\partial f}{\partial x} = 3x^2 e^{xy} + x^3 y e^{xy}$

$\frac{\partial f}{\partial x} = 3x^2 y e^{xy}$

$\frac{\partial f}{\partial x} = 3x^2 e^{xy} + x^4 e^{xy}$

$\frac{\partial f}{\partial x} = 3x^2 e^{xy}$

Let R be a closed region in two dimensional space. What does the double integral over R calculates?

Area of R.

Radius of inscribed circle in R.

Distance between two endpoints of R.

None of these

What is the distance between points (3, 2, 4) and (6, 10, -1)?

$7\sqrt{2}$

$2\sqrt{6}$

$\sqrt{34}$

$7\sqrt{3}$

-------------------- planes intersect at right angle to form three dimensional space.

Three

4

8

12

There is one-to-one correspondence between the set of points on co-ordinate line and ------------

Set of real numbers

Set of integers

Set of natural numbers

Set of rational numbers

Let the function $f(x, y)$ has continuous second-order partial derivatives $\left(f_{xx}\ ,\ \ f_{yy}\ and\ \ f_{xy} \right)$ in some circle centered at a critical point (x_0, y_0) and let $D = f_{xx}(x_0, y_0)\ f_{yy}(x_0, y_0) - f_{xy}{}^2(x_0, y_0)$

If $D = 0$ then ---------------

f has relative maximum at (x_0, y_0)

f has relative minimum at (x_0, y_0)

f has saddle point at (x_0, y_0)

No conclusion can be drawn.

$If\ R = \{(x, y)/0 \le x \le 2\, and\, 0 \le y \le 3\}, then$

$\iint\limits_R (1 - ye^{xy})dA =$

$\int_0^2 \int_0^3 (1 - ye^{xy})dydx$

$\int_0^2 \int_0^3 (1 - ye^{xy})dxdy$

$\int_2^3 \int_0^0 (1 - ye^{xy})dxdy$

$\int_0^2 \int_2^3 (4xe^{2y})dydx$

Suppose $f(x,\ y) = 2xy\ \ where\ \ x = t^2 + 1\ \ and\ \ y = 3 - t$. Which one of the following is true?

$\frac{df}{dt} = 6t - 4t^2 - 2$

$\frac{df}{dt} = 6t - 2$

$\frac{df}{dt} = 4t^3 + 6t - 6$

$\underline{\frac{df}{dt} = -6t^2 + 12t - 2}$

Let i, j and k be unit vectors in the direction of x-axis, y-axis and z-axis respectively. Suppose that $\vec{a} = 2i + 5j - k$. What is the magnitude of vector $\vec{a}$?

6
30
$\underline{\sqrt{30}}$
$\sqrt{28}$

A straight line is --------------- geometric figure.
One-dimensional
Two-dimensional
Three-dimensional
Dimensionless

$If\ R = \{(x, y) / 0 \le x \le 2\, and\, 1 \le y \le 4\}, then$
$\iint_R (6x^2 + 4xy^3) dA =$

$\int_1^4 \int_0^2 (6x^2 + 4xy^3) dydx$

$\int_0^2 \int_1^4 (6x^2 + 4xy^3) dxdy$

$\underline{\int_1^4 \int_0^2 (6x^2 + 4xy^3) dxdy}$

$\int_2^4 \int_0^1 (6x^2 + 4xy^3) dxdy$

Which of the following formula can be used to find the Volume of a parallelepiped with adjacent edges formed by the vectors $\vec{a}\ ,\vec{b}\ and\ \vec{c}$?

$\left|\vec{a}\times\left(\vec{b}\times\vec{c}\right)\right|$

$\left|\vec{a}\bullet\left(\vec{b}\bullet\vec{c}\right)\right|$

$\left|\vec{a}\bullet\left(\vec{b}\times\vec{c}\right)\right|$

$\left|\vec{a}\times\left(\vec{b}\bullet\vec{c}\right)\right|$

The function $f(x,\ y)=\sqrt{y-x}$ is continuous in the region --------- and discontinuous elsewhere.

$x\neq y$

$x\leq y$

$x>y$

What is the relation between the direction of gradient at any point on the surface to the tangent plane at that point ?

parallel

perpendicular

opposite direction

No relation between them.

Suppose $f(x,\ y)=x^3e^{xy}$. Which one of the statements is correct?

$\frac{\partial f}{\partial y}=3x^3e^{xy}$

$\frac{\partial f}{\partial y}=x^3e^{xy}$

$\frac{\partial f}{\partial y}=x^4e^{xy}$

$\frac{\partial f}{\partial y}=x^3ye^{xy}$

Two surfaces are said to intersect orthogonally if their normals at every point common to them are ----------

perpendicular

parallel

in opposite direction

Let the function $f(x, y)$ has continuous second-order partial derivatives $\left(f_{xx}\ ,\ \ f_{yy}\ and\ \ f_{xy}\right)$ in some circle centered at a critical point (x_0, y_0) and let

$$D = f_{xx}(x_0, y_0)\ f_{yy}(x_0, y_0) - f_{xy}{}^2(x_0, y_0)$$

If $D > 0$ and $f_{xx}(x_0, y_0) < 0$ then f has ---------------

Relative maximum at (x_0, y_0)

Relative minimum at (x_0, y_0)

Saddle point at (x_0, y_0)

No conclusion can be drawn.

$If\ R = \{(x, y) / 0 \le x \le 2\, and\, -1 \le y \le 1\}, then$

$$\iint_R (x + 2y^2) dA =$$

$$\int_{-1}^{1} \int_{0}^{2} (x + 2y^2) dydx$$

$$\int_{0}^{2} \int_{1}^{-1} (x + 2y^2) dxdy$$

$$\int_{-1}^{1} \int_{0}^{2} (x + 2y^2) dxdy$$

$$\int_{1}^{2} \int_{-1}^{0} (x + 2y^2) dxdy$$

If

$$f(x, y, z) = \frac{x^2 y}{z} + xyz$$

then what is the value of $f(1, 1, 1)$?

$f(1, 1, 1) = 1$

$f(1, 1, 1) = 2$

$f(1, 1, 1) = 3$
$f(1, 1, 1) = 4$

$If\ R = \{(x, y) / 0 \le x \le 4\, and\, 0 \le y \le 9\}, then$

$$\iint_R (3x - 4x\sqrt{xy})dA =$$

$$\int_0^9 \int_0^4 (3x - 4x\sqrt{xy})dydx$$

$$\int_0^4 \int_4^9 (3x - 4x\sqrt{xy})dxdy$$

$$\int_4^9 \int_0^0 (3x - 4x\sqrt{xy})dxdy$$

$$\int_0^4 \int_0^9 (3x - 4x\sqrt{xy})dydx$$

Q- $Let\ f(x, y) = 2 + x^2 + \frac{y^2}{4}$

$Find\ the\ gradient\ of\ f$

2MARKS

Q - Let the function $f(x, y)$ **is continuous in the region R, where R is a rectangle as shown below.complete the following equation**

$$\iint_R f(x, y)\, dA = \int \int f(x, y)\ \_\_\_\_\_\_$$

2MARKS

Q.Find all critical points of the function

$f(x, y) = 4xy - x^3 - 2y^2$

Evaluate $\int_1^4 \int_0^2 (6x^2 + 4xy^3)dx\ dy$

Q-Evaluate the following double integral.

$$\iint\left(3+2x-3y^{2}\right)\,dx\,dy$$

3MARKS

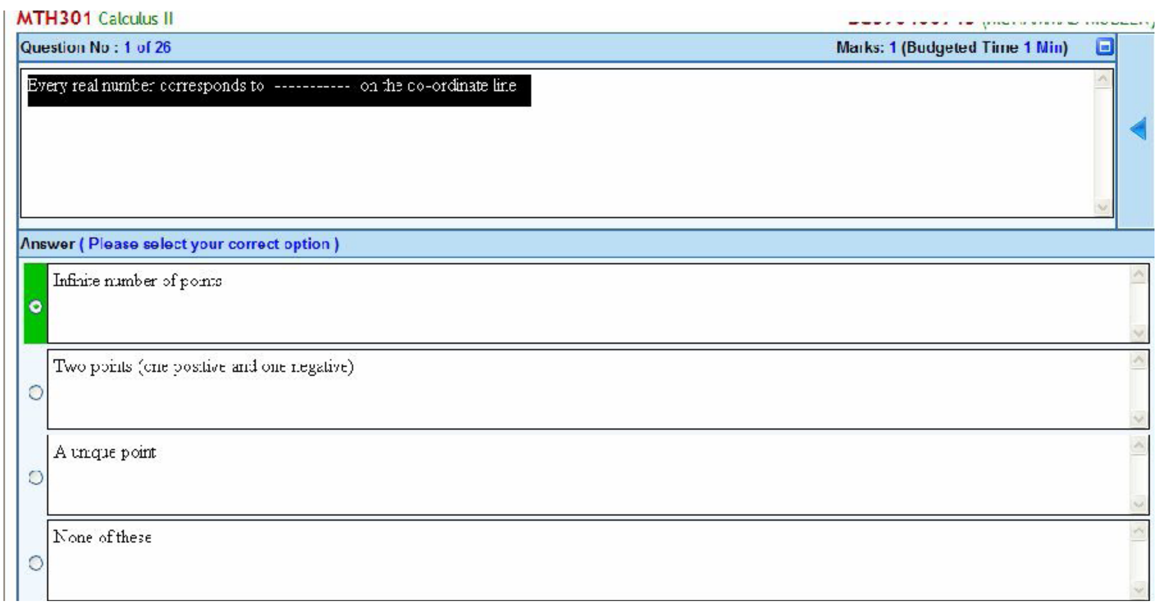
Q- Let $y=\dfrac{1}{x^{2}}$. If x changes from 3 to 3.3, find the approximate change in the value of y using differential dy.

3MARKS

MIDTERM EXAMINATION

MTH301

That all is collected by removing the mistakes of the one paper file, hope it helpful…!



MTH301 Calculus II

Question No : 1 of 26 Marks: 1 (Budgeted Time 1 Min)

Every real number corresponds to ----------- on the co-ordinate line

Answer (Please select your correct option)

- Infinite number of points
- Two points (one positive and one negative)
- A unique point
- None of these

In that the answer is "unique point"

MTH301 Calculus II

Question No : 2 of 26 Marks: 1 (Budgeted Time 1 Min)

There is one-to-one correspondence between the set of points on co-ordinate line and -----------

Answer (Please select your correct option)

- Set of real numbers
- Set of integers
- Set of natural numbers
- Set of rational numbers

In that the correct answer is the "Set of Real Numbers".

MTH301 Calculus II

Question No : 3 of 26 Marks: 1 (Budgeted Time 1 Min)

Which of the following is associated to each point of three dimensional space?

Answer (Please select your correct option)

- A real number
- An ordered pair
- An ordered triple
- A natural number

In this the exact answer is "an ordered triple".

MTH301 Calculus II

Question No : 4 of 26 Marks: 1 (Budgeted Time 1 Min)

All axes are positive in ----------- octant.

Answer (Please select your correct option)

- (selected) First
- Second
- Fourth
- Eighth

It's right

MTH301 Calculus II

Question No : 5 of 26 Marks: 1 (Budgeted Time 1 Min)

The spherical co-ordinates of a point are $\left(\sqrt{3}, \frac{\pi}{3}, \frac{\pi}{2}\right)$. What are its cylinderical co-ordinates?

Answer (Please select your correct option)

- $\left(\frac{\sqrt{3}}{2}, \frac{3}{2}, 0\right)$
- $\left(\sqrt{3}\cos\frac{\pi}{3}, \sqrt{3}\sin\frac{\pi}{3}, 0\right)$
- (selected) $\left(\sqrt{3}\sin\frac{\pi}{3}, \frac{\pi}{2}, \sqrt{3}\cos\frac{\pi}{3}\right)$
- $\left(\sqrt{3}, \frac{\pi}{3}, 0\right)$

This one is also wrong as the answer is "4th one".because the central point of spherical is pie/3 that should be same in cylindrical so, that's only occur in last one…

MTH301 Calculus II

Question No : 6 of 26 Marks: 1 (Budgeted Time 1 Min)

Suppose $f(x, y) = xy - 2y^2$ *where* $x = 3t + 1$ *and* $y = 2t$. Which one of the following is true?

Answer (Please select your correct option)

- (selected) $\frac{df}{dt} = -4t + 2$
- $\frac{df}{dt} = -16t - t$
- $\frac{df}{dt} = 18t + 2$
- $\frac{df}{dt} = -10t^2 + 8t + 1$

That's right

MTH301 Calculus II

Question No : 7 of 26 Marks: 1 (Budgeted Time 1 Min)

Let $w = f(x, y, z)$ and $x = g(r, s)$, $y = h(r, s)$, $z = t(r, s)$ then by chain rule

$\frac{\partial w}{\partial r} =$

Answer (Please select your correct option)

- $\frac{\partial w}{\partial x}\frac{\partial x}{\partial r} + \frac{\partial w}{\partial y}\frac{\partial y}{\partial r} + \frac{\partial w}{\partial z}\frac{\partial z}{\partial r}$
- $\frac{\partial w}{\partial r}\frac{\partial x}{\partial r} + \frac{\partial w}{\partial r}\frac{\partial y}{\partial r} + \frac{\partial w}{\partial r}\frac{\partial z}{\partial r}$
- (selected) $\frac{\partial w}{\partial x}\frac{\partial x}{\partial r}\frac{\partial x}{\partial s} + \frac{\partial w}{\partial y}\frac{\partial y}{\partial r}\frac{\partial y}{\partial s} + \frac{\partial w}{\partial z}\frac{\partial z}{\partial r}\frac{\partial z}{\partial s}$
- $\frac{\partial w}{\partial r}\frac{\partial r}{\partial x} + \frac{\partial w}{\partial r}\frac{\partial r}{\partial y} + \frac{\partial w}{\partial r}\frac{\partial r}{\partial z}$

Here's answer is the "2nd" one...!

MTH301 Calculus II

Question No : 8 of 26 Marks: 1 (Budgeted Time 1 Min)

Magnitude of vector $\vec{a}$ is 2, magnitude of vector $\vec{b}$ is 3 and angle between them when placed tail to tail is 45 degrees. What is $\vec{a} \cdot \vec{b}$?

Answer (Please select your correct option)

- 4.5
- 6.2 (selected)
- 5.1
- 4.2

That can't say exactly guys, its formula is following…!

a.b = |a||b| cosØ

Ø=angle between the vectors

MTH301 Calculus II

Question No : 9 of 26 Marks: 1 (Budgeted Time 1 Min)

Is the function $f(x, y)$ continuous at origin? If not, why?

$$f(x,y)=\begin{cases}0 & \text{If } x \ge 0 \text{ and } y \ge 0\\ 1 & \text{Otherwise}\end{cases}$$

Answer (Please select your correct option)

- $f(x, y)$ is continuous at origin
- $f(0, 0)$ is not defined (selected)
- $f(0, 0)$ is defined but $\lim_{(x,y)\to(0,0)} f(x, y)$ does not exist
- $f(0, 0)$ is defined and $\lim_{(x,y)\to(0,0)} f(x, y)$ exists but these two numbers are not equal.

That's correct answer…!

MTH301 Calculus II

Question No : 10 of 26 Marks: 1 (Budgeted Time 1 Min)

Is the function $f(x, y)$ continuous at origin? If not, why?

$$f(x,y)=\begin{cases}\dfrac{3x^2y}{x^2+y^2} & if\ (x,y)\neq 0\\ 0 & if\ (x,y)=0\end{cases}$$

Answer (Please select your correct option)

- $f(x, y)$ is continuous at origin
- $f(0, 0)$ is not defined
- $f(0, 0)$ is defined but $\lim\limits_{(x,y)\to(0,0)} f(x, y)$ does not exist
- $f(0, 0)$ is defined and $\lim\limits_{(x,y)\to(0,0)} f(x, y)$ exists but these two numbers are not equal.

But that's wrong the correc one is the 1st..

MTH301 Calculus II

Question No : 11 of 26 Marks: 1 (Budgeted Time 1 Min)

Let R be a closed region in two dimensional space. What does the double integral over R calculates?

Answer (Please select your correct option)

- Area of R
- Radius of inscribed circle in R
- Distance between two endpoints of R.
- None of these

That's the first answer, as that was been define in the lecture 22…!

MTH301 Calculus II

Question No : 12 of 26 Marks: 1 (Budgeted Time 1 Min)

Which of the following formula can be used to find the Volume of a parallelepiped with adjacent edges formed by the vectors $\bar{a}$, $\bar{b}$ and $\bar{c}$?

Answer (Please select your correct option)

- $\left|\bar{a}\times(\bar{b}\times\bar{c})\right|$
- $\left|\bar{a}\bullet(\bar{b}\bullet\bar{c})\right|$
- $\left|\bar{a}\bullet(\bar{b}\times\bar{c})\right|$
- $\left|\bar{a}\times(\bar{b}\bullet\bar{c})\right|$

Here's the answer is the last one, you can check that on the start of lecture 11th, handout…!

MTH301 Calculus II

Question No : 13 of 26 Marks: 1 (Budgeted Time 1 Min)

Two surfaces are said to be orthogonal at a point of their intersection if their normals at that point are --------

Answer (Please select your correct option)

- Parallel
- Perpendicular
- In opposite direction

Its answer is the "perpendicular"…!

MTH301 Calculus II

Question No : 14 of 26 Marks: 1 (Budgeted Time 1 Min)

By Extreme Value Theorem, if a function $f(x, y)$ is continuous on a closed and bounded set R, then $f(x, y)$ has both ---------------- on R.

Answer (Please select your correct option)

- (selected) Absolute maximum and absolute minimum value
- Relative maximum and relative minimum value

That's right answer…!

MTH301 Calculus II

Question No : 15 of 26 Marks: 1 (Budgeted Time 1 Min)

Let the function $f(x, y)$ has continuous second-order partial derivatives $(f_{xx},\ f_{yy}\ and\ f_{xy})$ in some circle centered at a critical point (x_0, y_0) and let $D = f_{xx}(x_0, y_0)\, f_{yy}(x_0, y_0) - f_{xy}{}^2(x_0, y_0)$

If $D > 0$ and $f_{xx}(x_0, y_0) < 0$ then f has ---------------

Answer (Please select your correct option)

- (selected) Relative maximum at (x_0, y_0)
- Relative minimum at (x_0, y_0)
- Saddle point at (x_0, y_0)
- No conclusion can be drawn.

This is also right one..!

MTH301 Calculus II

Question No : 16 of 26 Marks: 1 (Budgeted Time 1 Min)

Let the function $f(x, y)$ has continuous second-order partial derivatives $(f_{xx}, f_{yy} \text{ and } f_{xy})$ in some circle centered at a critical point (x_0, y_0) and let $D = f_{xx}(x_0, y_0) f_{yy}(x_0, y_0) - f_{xy}^2(x_0, y_0)$

If $D = 0$ then ---------------

Answer (Please select your correct option)

- f has relative maximum at (x_0, y_0)
- f has relative minimum at (x_0, y_0)
- f has saddle point at (x_0, y_0)
- No conclusion can be drawn

"No conclusion can be drawn" is the answere…!

MTH301 Calculus II

Question No : 17 of 26 Marks: 1 (Budgeted Time 1 Min)

If $R = R_1 \cup R_2$, where R_1 and R_2 are no overlapping regions then

$$\iint_{R_1} f(x,y)dA + \iint_{R_2} f(x,y)dA =$$

Answer (Please select your correct option)

- $\iint_{R} f(x,y)dA$
- $\iint_{R_1} f(x,y)dA \cup \iint_{R_2} f(x,y)dA$
- $\iint_{R} f(x,y)dV$
- $\iint_{R_1} f(x,y)dA \cap \iint_{R_2} f(x,y)dA$

Its answer is the first one option…!

MTH301 Calculus II

Question No : 18 of 26 — Marks: 1 (Budgeted Time 1 Min)

If $R = \{(x,y) \mid 0 \le x \le 2 \text{ and } 1 \le y \le 4\}$, then

$\iint_R (6x^2 + 4xy^3)\,dA =$

Answer (Please select your correct option)

- $\int_1^4 \int_0^2 (5x^2 + 4xy^3)\,dydx$
- $\int_0^2 \int_1^4 (5x^2 + 4xy^3)\,dxdy$ (selected)
- $\int_1^4 \int_0^2 (5x^2 + 4xy^3)\,dxdy$
- $\int_2^4 \int_0^1 (5x^2 + 4xy^3)\,dxdy$

Its answer is the 3rd option

MTH301 Calculus II

Question No : 19 of 26 — Marks: 1 (Budgeted Time 1 Min)

If $R = \{(x,y) \mid 2 \le x \le 4 \text{ and } 0 \le y \le 1\}$, then

$\iint_R (4xe^{2y})\,dA =$

Answer (Please select your correct option)

- $\int_0^1 \int_2^4 (4xe^{2y})\,dydx$
- $\int_0^1 \int_2^4 (4xe^{2y})\,dxdy$ (selected)
- $\int_1^4 \int_0^2 (4xe^{2y})\,dxdy$
- $\int_1^4 \int_0^2 (4xe^{2y})\,dydx$

It's right one…!

MTH301 Calculus II

Question No : 20 of 26 Marks: 1 (Budgeted Time 1 Min)

If $R = \{(x,y) / 0 \le x \le 4 \text{ and } 0 \le y \le 9\}$, then

$\iint_R (3x - 4x\sqrt{xy})\,dA =$

Answer (Please select your correct option)

- $\int_0^5 \int_0^4 (3x - 4x\sqrt{xy})\,dy\,dx$
- $\int_0^4 \int_4^9 (3x - 4x\sqrt{xy})\,dx\,dy$
- $\int_4^5 \int_0^0 (3x - 4x\sqrt{xy})\,dx\,dy$
- (selected) $\int_0^4 \int_0^9 (3x - 4x\sqrt{xy})\,dy\,dx$

This one's also right…

MTH301 Calculus II

Question No : 21 of 26 Marks: 2 (Budgeted Time 4 Min)

Suppose that the surface $f(x, y, z)$ has continuous partial derivatives at the point (a, b, c). Write down the equation of tangent plane at this point.

Answer (Please click here to Add Answer)

Its equation is

$$f_x(a)(x - x_0) + f_y(b)(y - y_0) + f_z(c)(z - z_0) = 0$$

MTH301 Calculus II

Question No : 22 of 26 Marks: 2 (Budgeted Time 4 Min)

Evaluate the following double integral.

$\iint (12xy^2 - 8x^3)\ dy\ dx$

MTH301 Calculus II

Question No : 23 of 26 Marks: 3 (Budgeted Time 6 Min)

Evaluate the following double integral.

$\iint (3 + 2x - 3y^2)\ dx\ dy$

Answer (Please click here to Edit Answer)

These both can be solve by the following example the me gonna paste…!

Evaluate the following double integral.

$$\iint (3 + 2x - 3y^2)\ dx\ dy$$

Solution:

$$\iint (3 + 2x - 3y^2)\ dx\ dy$$

$$\int (3x + 2x^2 - 3xy^2)dy$$

$$3xy + 2x^2y - xy^3$$

MTH301 Calculus II

Question No : 24 of 26 Marks: 3 (Budgeted Time 6 Min)

Let $f(x, y, z) = xy^2e^z$

Find the gradient of f.

Answer (Please click here to Add Answer)

didn't got this question dear's…!

MTH301 Calculus II

Question No : 25 of 26 Marks: 5 (Budgeted Time 10 Min)

Find, Equation of Tangent plane to the surface $f(x, y, z) = x^2 + y^2 + z - 9$ at the point $(1, 2, 4)$

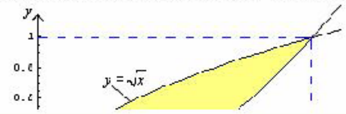
Answer (Please click here to Add Answer)

You can use the above tangent equation to sove this...!

MTH301 Calculus II

Question No : 26 of 26 Marks: 5 (Budgeted Time 10 Min)

Use double integral in rectangular co-ordinates to compute area of the region bounded by the curves $y = x^2$ and $y = \sqrt{x}$.



Answer (Please click here to Add Answer)

Its answer is the under mentioned...!

as our require is area of the following region

$$V = \iint_R 1dA = \iint_R dA$$ we can compute area by keeping f(x,y) const

$$= \int_0^1 \int_{x^2}^{x} dydx$$

$$= \int_0^1 [x]_{x^2}^{x}$$

$$= \int_0^1 (x - x^2)$$

$$= \left[\frac{x^2}{2} - \frac{x^3}{3}\right]_0^1$$

$$= \left[\frac{1}{2} - \frac{1}{3}\right]$$

$$= \left[\frac{3-2}{6}\right]$$

$$= \frac{1}{6}$$ that's exactly what we require...!